

**REMARKS**

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.112, and in light of the remarks which follow are respectfully requested.

Claims 1-30 are pending herein, new Claims 15-30 having been added above.

Claims 1, 3, 9 and 14 have been amended. Several features of Claim 1 have been moved to new dependent Claims 15 and 16 to more particularly point out these aspects of the invention. Applicants have removed the language "substituted or unsubstituted" from Claim 1, but this amendment is not intended to limit the scope of the claim. In addition, applicants have properly identified the monomer of formula I as being polyfunctional. Also in Claim 1, the groups of compounds representing  $R_3$ ,  $R_4$  and  $R_5$  have been amended. In Claim 3, the percent signs have been removed since ratios do not have units, and the comma at the end of the sentence has been removed. Claim 9 has been amended to clarify the process involved. In Claim 14, the percent signs have also been removed since ratios do not have units.

Claims 1-14 stand rejected under 35 U.S.C. §112 as purportedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Amendments have been made to Claims 1, 3, 9 and 14 to obviate this rejection. Thus, the rejection should be withdrawn.

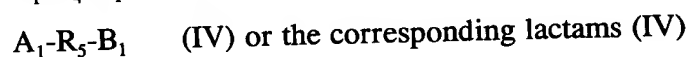
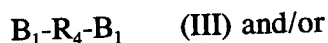
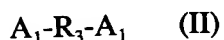
Claims 1-5, 7-9 and 13-14 stand rejected under 35 U.S.C. 102(b) as being anticipated by *Aharoni* (U.S. Patent No. 5,480,944). This rejection is respectfully traversed for at least the following reasons.

The present invention relates to a thermoplastic copolyamide, a composition comprising the thermoplastic copolyamide as a matrix, and a process for manufacturing the thermoplastic copolyamide.

The copolyamide, as described in Claim 1, is the result of the reaction between at least one monofunctional monomer satisfying the following general formula I:



and at least one of the bifunctional monomers of the following formulae II to IV with, optionally, at least one of the monofunctional monomers of the following formulae V or VI. The copolyamide can also be the result of a reaction between at least one monofunctional monomer satisfying the general formula I with a prepolymer obtained from at least one bifunctional monomer of the following formulae II to IV and, optionally, at least one monofunctional monomer of the following formulae V or VI. The bifunctional monomers satisfying the following general formulae:



and the monofunctional monomers satisfying the following general formulae:



in which  $R_3$ ,  $R_4$ ,  $R_5$  represent linear or branched alkyl hydrocarbon radicals or cycloaliphatic radicals possibly including unsaturated groups.

*Aharoni* discloses a composition comprising blends of polymers wherein one of the polymers disclosed is a branched fractal polymer. In Example I, Part II, *Aharoni* discloses the formation of a stiff-AB type fractal polyamide. Col. 14, line 57 to col. 15, line 1. The monomers utilized include 1,3,5-benzenetricarboxylic acid, pyridine, 5-aminoisophthalic acid and 4-aminobenzoic acid (col. 14, lines 55-67).

*Aharoni* does not disclose or suggest each of the features of the presently claimed invention. For example, *Aharoni* does not disclose or suggest a bifunctional monomer of formulae II to IV. The middle of the compound in each of these three formulae,  $R_3$ ,  $R_4$ , and  $R_5$  respectively, is a linear or branched hydrocarbon radical or a cycloaliphatic radical possibly containing unsaturated groups. *Aharoni* does not disclose or suggest any bifunctional monomer with the center of the compound meeting the requirements of  $R_3$ ,  $R_4$  or  $R_5$ , as set forth, for example, in independent Claim 1.

Additionally, Example II, of *Aharoni* discloses using monomers such as 1, 3, 5-benzenetricarboxylic acid, pyridine 5-aminoisophthalic acid and 4-aminobenzoic acid. See

*Aharoni* at column 14, lines 55-67. Further, in this Example the multifunctional monomer quantity is 0.1 mol and the total quantity of bifunctional monomers and monofunctional monomers is 0.1 mol. Accordingly, the ratio of multifunctional monomers to bifunctional and monofunctional monomers is 0.1 to 0.1, or simply 1. This ratio is kept at approximately 1 in all of the Examples of *Aharoni*.

Also, the specification of *Aharoni* discloses a branched fractal polymer preferably comprising a mol percent of branching monomeric units (multifunctional monomers) from about 100 to about 33 and a mol percent of extension monomeric units (bifunctional monomers) from about 10 to about 75. *Aharoni* also discloses that a most preferred mol percent of branching monomeric units is from about 70 to about 45 and a mol percent of extension monomeric units is from about 30 to about 65. See *Aharoni* at column 7, line 66 to column 8 line 7. Thus, the molar ratio of multifunctional monomers to bifunctional and monofunctional monomers disclosed in *Aharoni* is significantly greater than 5% (0.05).

Thus, *Aharoni* fails to disclose or suggest a branched copolyamine with a molar ratio of multifunctional monomers to bifunctional and monofunctional monomers being between 0.01 and 5 or being between 0.0001 and 0.05, as set forth, for example, in Claim 3 and new Claim 17.

Therefore, *Aharoni* does not disclose each and every element of the claimed invention. Accordingly, withdrawal of the §102(b) rejection based on *Aharoni* is requested.

Claims 1-5 and 7-9 also stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Aharoni* (U.S. Patent No. 5,480,944) in view of *Fisch* (U.S. Patent No. 5,760,163). For at least the following reasons, this rejection should be withdrawn.

As previously explained, *Aharoni* fails to disclose or suggest a bifunctional monomer of formulae II to IV, as set forth, for example, in independent Claim 1.

In addition to failing to disclose or suggest the claimed bifunctional monomer of formulae II to IV, *Aharoni* also fails to disclose or fairly suggest a branched copolyamine having a molar ratio of monofunctional monomers to bifunctional and monofunctional monomers being between 0.01 and 5, as set forth, for example, in Claim 3 and new Claim 17.

This lower molar ratio of multifunctional monomers is important because it allows the copolyamides containing the multifunctional monomers to exhibit a high melt viscosity. A high melt viscosity is a useful property for extrusion blow-molding processes. In addition, the low molar ratio of the present invention permits a copolyamide to exhibit mechanical properties that are at least equivalent to those of a corresponding linear polyamide. See specification at page 5, line 24 to page 6, line 4.

*Fisch* fails to overcome the deficiencies of *Aharoni*.

*Fisch* discloses a process for preparation of branched polyamides. The process discloses steps of utilizing polyamide prepolymer, which is then combined with polyfunctional carboxylic acids and additives (see Abstract).

*Fisch* fails to disclose or suggest the copolyamide of the presently claimed invention. In fact the multifunctional monomer of *Fisch* is of the type  $A_n$  in which A is a carboxylic function. Clearly, this monomer is substantially different from the multifunctional monomer of formula I of the presently claimed invention.

In addition, even though *Fisch* does disclose a difunctional monomer, there is no motivation to combine *Fisch* with *Aharoni* to arrive at the presently claimed invention. *Fisch* discloses reacting difunctional monomers only with polyfunctional carboxylic acids, with the number of free carboxylic acid groups greater than 3 (col. 4, lines 19-21). The polyfunctional carboxylic acids with more than three acid groups, described in *Fisch*, are quite different from the polyfunctional compounds described in formula I of the claimed invention. Therefore, there is no motivation to combine *Fisch* and *Aharoni*, and it would not have been obvious to do so. Thus, for at least the above reasons, no case of obviousness has been established and the §103(a) rejection based on *Aharoni* in view of *Fisch* should be withdrawn.

Accordingly, withdrawal of these rejections is respectfully requested.

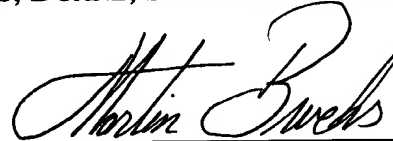
From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at his earliest convenience.

Respectfully submitted,

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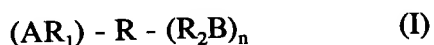
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Date: October 11, 2001

**Attachment to Amendment dated October 11, 2001**

**Marked-up Claims 1, 3, 9, 14**

1. (Twice Amended) Thermoplastic copolyamide resulting from the reaction between at least one polyfunctional [monofunctional] monomer satisfying the following general formula I:



in which:

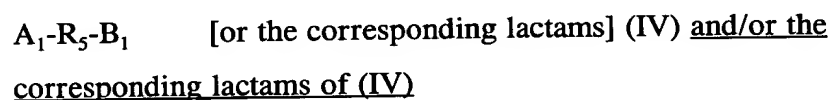
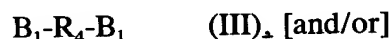
- n is an integer greater than or equal to 2,
- $R_1$ ,  $R_2$  may be identical or different and represent a covalent bond or an aliphatic, arylaliphatic, aromatic or alkylaromatic hydrocarbon radical,
- R is a linear or branched aliphatic radical, a [substituted or unsubstituted] cycloaliphatic radical, an [a substituted or unsubstituted] aromatic radical [possibly comprising several aromatic rings and/or hetero atoms], or a polymeric chain [possibly containing hetero atoms],
- A represents an [the] amine or amine salt functional group, or an [the] acid, ester, acid halide or amide functional group,
- B represents an [the] amine or amine salt functional group when A is [represents] an acid, ester, acid halide or amide functional group, [and] or B is an acid, ester, acid halide or amide function group when A is [represents] an amine or amine salt functional group,

and at least one [of the] bifunctional monomer[s] of the following formulae II to IV [with], and optionally, [some of the] a monofunctional monomer[s] of the following formulae V or VI;[,] or [with] a prepolymer obtained from at least one difunctional monomer of the following formulae II to IV and, optionally, at least one monofunctional monomer of the following formulae V or VI,

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**Marked-up Claims 1, 3, 9, 14**

- the [difunctional] bifunctional monomers satisfying the following general formulae:



- the monofunctional monomers satisfying the following general formulae:



in which

-  $A_1, B_1$  may be identical or different and represent[, respectively,] an acid, ester or acid chloride functional group, [and] an amine functional group or an amine salt,

-  $R_3, R_4, R_5$  may be identical or different and represent linear or branched alkyl hydrocarbon radicals or cycloaliphatic radicals possibly including unsaturated groups.

-  $[R_3, R_4, R_5, R_6, R_7]$  may be identical or different and represent substituted or unsubstituted, aromatic, linear or branched, alkyl hydrocarbon radicals or alkylaryl, arylalkyl or cycloaliphatic radicals [possibly] optionally including unsaturated groups.

3. (Twice Amended) Copolyamide according to Claim 1, wherein the molar ratio of the multifunctional monomers of formula I to the sum of the difunctional monomers of formulae II, III, IV and monofunctional monomers of formulae V and VI is between 0.01[%] and 5[%].

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**Marked-up Claims 1, 3, 9, 14**

9. (Twice Amended) Process for manufacturing a copolyamide according to Claim 1, comprising adding, into the reaction mass containing difunctional monomers of formulae II to IV and, optionally, monofunctional monomers of formulae V or VI, [leading to a linear polyamide, ]a predetermined amount of a multifunctional monomer of formula I and then in carrying out the polycondensation under the temperature and pressure conditions used for the polymerization of the [said] linear polyamide which would be formed from the monomers of formulae II to IV and, optionally, monofunctional monomers of formulae V or VI.

14. (Amended) The copolyamide according to Claim 3, wherein the molar ratio is between .05[ %] and 1[ %].